
PAUL WRAY, IOWA STATE UNIVERSITY, BUGWOOD.ORG

Hickory Dieback and Mortality

Biology, Symptoms and Management

FOREST HEALTH FACTSHEET

Wisconsin Department of Natural Resources, Division of Forestry, Forest Health Program, Revised May 2017

LOCATIONS

Rapid dieback and mortality of hickory trees (*Carya* spp.), have been reported in Wisconsin, Minnesota, Iowa, Missouri and several eastern states in recent decades.

IMPACT

Hickory dieback and mortality have been observed on both bitternut and shagbark hickory, but mortality of bitternut is much more common. Thinning crowns progress quickly to whole tree mortality. Mortality of all mature hickory in a stand typically occurs over several years. Seedlings and saplings up to a few inches in diameter are not impacted.

BIOLOGY

Rapid hickory mortality is caused by hickory bark beetles in combination with the fungus *Ceratocysis smalleyi*. The hickory bark beetle, native to Wisconsin (Figure 1), is regarded as the most destructive insect of hickory in the eastern United States. Although the insect usually attacks over-mature, weak, or recently killed trees, healthy trees of all ages are also infested during outbreaks. The insect overwinters as a larva in the tree. The larvae attack and kill hickory trees by mining the phloem tissue under the bark. Larval feeding galleries are centipede-shaped and 5-6 cm wide (Figure 2). Adults begin to emerge around the middle of June, leaving round holes in the tree, about 3mm in diameter. The highest beetle populations are observed in July and early August.

The wounds caused by hickory bark beetles allow *C. smalleyi* to enter the trees. As more and more beetles attack a tree, hundreds or thousands of cankers develop below the bark (Figure 3). Cankers disrupt water transport and sap flow, leading to rapid crown decline. This interaction of the hickory bark beetles and *C. smalleyi* fungi in combination with host stress such as drought, results in canopy dieback and ultimately tree death.

Other insects and fungi may also contribute to hickory dieback but are not the cause of rapid

NATASHA WRIGHT, COOK'S PEST CONTROL, BUGWOOD.ORG

Figure 1. *Adult hickory bark beetles are 3-5 mm long.*

Figure 2. *Hickory bark beetle gallery.*

Figure 3. *Hickory canker caused by the fungus* C. smalleyi.

mortality. The hickory timber beetle (*Xyleborus celsus*), hickory agrilus (*Agrilus otiosus*) and the red-shouldered bostrichid (*Xylobiopsis basilaris*) have been recovered from dead and dying trees. Fresh cut hickory logs may also be attacked by the painted hickory borer (*Megacyllene caryae*). The fungal pathogen *Fusarium solani* causes stem cankers that lead to canopy dieback in hickory. Additionally, galls on the main stem or branches caused by *Phomopsis* spp. fungi are a common cause of dieback (Figure 4). Armillaria root rot may also contribute to mortality.

LINDA HAUGEN, USDA FOREST SERVICE, BUGWOOD.ORG

Figure 4. Phomopsis *galls on the main stem of a bitternut hickory.*

Hickory mortality in Wisconsin.

Inspecting dying hickory for hickory bark beetle and C. smalleyi.

IDENTIFICATION

Symptoms progress rapidly from thinning crowns with wilting leaves, to branch mortality, to complete tree mortality. Epicormic branches often sprout from the main stem only to wilt and die later, and bleeding cankers can often be found on these trees.

PREVENTION

Recommended forest management activities such as thinning overstocked stands and avoiding additional stress to stands during drought will help prevent buildup of beetle populations.

MANAGEMENT

Options for managing hickory mortality are limited. After hickory bark beetles and *C. smalleyi* start killing trees there are no practical options for stopping spread throughout the stand. Landowners with stands composed of approximately 20% hickory or more should consider a salvage harvest as soon as dieback or mortality is noticed. Landowners should work with a forester or forest health specialist to confirm the cause and decide on an appropriate management plan. Hickory also makes excellent firewood and may be kept on site and utilized. **Do not move infected hickory firewood for at least one year after tree mortality to avoid spreading the insects and fungi to uninfected areas.** Insecticide applications in July on trunks and large branches of high value yard trees can be effective to protect from infestation by hickory bark beetles, but are not practical in forests. Hickory regeneration is not impacted in affected stands and should continue to be a part of stands with appropriate site conditions.

Photo credits: Wisconsin DNR unless credited otherwise.

WISCONSIN DEPT. OF NATURAL RESOURCES

Printed on recycled paper.

Wisconsin Department of Natural Resources
PO Box 7921, Madison, WI 53707-7921

PUB-FR-622b 2017

For more information contact your local forester or forest health specialist (dnr.wi.gov, keywords "*forest health staff*" or "*forester*.")